

Claims

1. Polyurethane resin, obtainable by
 - a) reacting 1-isocyanato-5-isocyanatomethyl-3,3,5-trimethylcyclohexane (isophorone diisocyanate (IPDI)) alone or together with one or more aliphatic diisocyanates, with a polyether polyol having an average molecular weight in the range of 1000 to less than 3000 g/mol;
 - b) adding a diamine;
 - c) adding a polyol having an average molecular weight of equal or less than 800 g/mol; and
 - d) optionally reacting the product obtained in steps a) to c) with at least one terminating agentwherein the ratio of equivalent weights of diisocyanates to the group of isocyanate-reactive components consisting of the said polyether polyol, the said diamine, the said polyol, and the said terminating agent is 1:1 or greater than 1.
2. Polyurethane resin according to claim 1 or 2, wherein the ratio of equivalent weights of diisocyanate components to said polyetherpolyol is in a range of between 3,6: 1 and 1:1, preferably about 2:1.
3. Polyurethane resin according to any of claims 1 to 3, wherein the polyether polyol is poly-THF2000.
4. Polyurethane resin according to any of claims 1 to 4, wherein the diamine is isophorone diamine.
5. Polyurethane resin according to any of claims 1 to 5, wherein the polyol is 1,4-butanediol.
6. Polyurethane resin according to any of claims 1 to 3, having a weight average molecular weight in the range of 20000 to 80000 g/mol, preferably between 25000 to 55000 g/mol.

7. Polyurethane resin according to any of claims 1 to 6, having a degree of urethanisation between 20 and 30%.
8. Method of forming a polyurethane resin, comprising the steps of
 - a) reacting 1-isocyanato-5-isocyanatomethyl-3,3,5-trimethylcyclohexane (isophorone diisocyanate (IPDI) alone or together with one or more aliphatic diisocyanates, with a polyether polyol having an average molecular weight in the range of 1000 to less than 3000 g/mol;
 - b) adding a diamine;
 - c) adding a polyol having an average molecular weight of equal or less than 800 g/mol; and
 - d) optionally reacting the product obtained in steps a) to c) with at least one terminating agentwherein the ratio of equivalent weights of diisocyanates to the group of isocyanate-reactive components consisting of the said polyether polyol, the said diamine, the said polyol, and the said terminating agent is 1:1 or greater than 1.
9. A coating composition, preferably printing ink, comprising a solvent and at least one polyurethane resin according to one of the claims 1 to 8 as film forming binder.
10. Use of a polyurethane resin according to claims 1 to 8 as at least one film forming binder in printing inks for printing plastic substrates, preferably polyolefinic plastic substrate.
11. Method of producing a laminate carrying a printed layer, said method comprises the steps of
 - a) providing a coating composition, preferably a printing ink according to claim 10;
 - b) applying a layer to a first substrate, preferably a plastic foil, by printing said printing ink of step a) in a flexographic and/or gravure printing process;

- c) removing said solvent from said layer thereby drying and/or curing said layer obtained in step b),
- d) applying an adhesive to the dried and/or cured layer obtained in step c) and producing the laminate by applying at least a second substrate, preferably a plastic foil, on the adhesive.

13. Laminate produced by the method of claim 12.